

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON

Letter
Circular
LC-882
(Supersedes
LC-814)

REVISED CLASSIFICATION OF RADIO SUBJECTS USED
IN NATIONAL BUREAU OF STANDARDS

November 3, 1947

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I. Introduction

The present pamphlet is a combination of LC814, January 11, 1946, the supplement of September 30, 1946 and additions to the classification found necessary for keeping up with current radio literature. LC814 was a revision of B of S Circular 385, "Classification of Radio Subjects - An Extension of the Dewey Decimal System," published in 1930. The latter, in turn, was a revision of the Bureau's Circular C138, published in 1923. As indicated in the title of Circular C385, the classification was an extension of the general Dewey Decimal System, prepared by Doctor Melvin Dewey for classifying books, publications, references, and other material as found in reference and public libraries. The Dewey Classification at that time did not include a detailed classification for radio, and the Bureau's Circular C385 was designed to fill the need of organizations desiring a classification

table covering radio science. The classification presumably could be expanded in any part where the user found it desirable to further subdivide a given topic. This possibility was not followed at the Bureau, so that as the years passed and hundreds of new topics appeared, it became difficult to file new references according to Circular C385. A revised classification was accordingly prepared; this will be added to whenever it is deemed necessary.

II. The Dewey Decimal System of Classification

Under the Dewey decimal system, classification is by subject, numbers being used to show the relative positions of the books, cards, or other material. The numbers, therefore, show both what the material is (that is, its subject matter), and where the material is (that is, its location on the shelves or in the files). In the classification list the indentation and the figures prefixed to each item show the rank of each subject in the classification.

Accompanying the extended classification is an alphabetical index. The index is used in determining the number to assign to a given item or material, or to learn where to place it in the files. The index is also used by any person desiring to locate the material covering a given subject. The reference number tells immediately where all material on that and on related subjects can be found.

The whole subject of radio is given the number 621.384 in the Dewey classification. The relation of this place to the general field of knowledge is shown by the following table:

Class	600	Useful arts
	20	Engineering
	1	Mechanical
	0.300	Electrical
	.080	Communication
	.004	Radio

In a strictly radio library or office it is convenient to represent the figure 621.384 by "R" and this abbreviation is used below in the further classification of radio. Thus, R211 indicates 621.384.211.

III. Classification of Radio Subjects

In the classification of radio subjects the main features of the Dewey system as to subject and form classification are retained.

The class (R800) is anomalous. This space in the classification is actually used for nonradio subjects. Such material should, however, be given its regular class number according to the Dewey system.

If it were arranged in strictly numerical order, some of this material would come before radio and some after radio. By choosing arbitrarily to use the space denoted by R800 for this purpose it is possible to arrange the nonradio material in classified order, but to keep it subordinate to a large volume of radio material. Accordingly, a number of nonradio items are included where R800 comes in the list under Section IV below, but are given their number according to the complete classification.

In filing a specific paper under a given class or subdivision, a convenient file number for it can readily be made by using its subject classification number plus a small letter; the order chosen for the letters used for subsequent papers can be according to author, chronological order of accession, or any other consideration depending on the circumstances.

In a card file of references to periodical literature, it is convenient to arrange the cards under each final class or subdivision either in chronological order or in alphabetical order by the names of authors. Cross references may be made conveniently in such a card file by preparing two or more cards and marking each card, after the file number, "X ____". For example, suppose an article on fading (R113.1) includes a method of measuring field intensity by the calibrated loop antenna method (R271.11); two cards should be made out, one marked R113.1 XR271.11 and the other R271.11 XR113.1.

The needs of individual collections of files vary widely, and expansions of the system can be made by any person using the system.

The former Circular was arranged so that the numbers used indicated the type of article, i.e., whether dealing chiefly with general radio material, radio principles, measurements, apparatus, communication systems, applications, stations, manufacturing, or nonradio subjects, as shown by number in the groups R000, R100, R200, R300, R400, R500, R600, R700, and R800*, respectively. This arrangement brought in a certain amount of duplication, particularly in the R100, R200, and R300 groups. Other difficulties were experienced in use; for example, it was found necessary to file some theoretical articles under the R300 group, and some descriptive articles under the R100 group, because of lack of classification numbers in the desired group.

In the revised classification the same general outline of the different hundreds groups has been used, but in certain sections numbers close together provide for theory, apparatus, and procedure. Likewise, the R100 group does not provide for theoretical articles on every subject and item in the table, so that if the reference relates to theory of an item found only in the R300 group, it must be filed under that number.

*The numbers in this group were taken directly from the Dewey Classification Tables and appeared with the numbers as given by Dewey, with a few additions.

In order to overcome some of these inconsistencies, it appeared that a complete change would have to be made in the classification. This seemed undesirable because of the work involved in making a complete new system, and the work required to change files made in accordance with Circular C385 to agree with a new system. The changes made in the numbering have not been numerous, and it is hoped that users of the revised classification will not have difficulty.

It is expected that additions to the present system will be made (1) from suggestions received by users, (2) as the need develops, and (3) as secret material becomes unclassified.

The present revision, although based on Bureau of Standards Circular C385, which in turn was based upon the twelfth edition, 1927, of Doctor Melvin Dewey's book "Decimal Classification and Relative Index for Libraries, Clipping Notes, etc.", should not be confused with the fourteenth edition, 1942, of that book, which devoted some space to radio. The subjects covered in that edition have numbers differing from those assigned in this Circular.

IV. Revised Classification of Radio Subjects

R000	RADIO. (Material of a general nature for which no specific classification can be used and which relates to the field as a whole.)
R000.1	.....Developments in other countries.
R001	.....Statistics.
R004	.....Design.
R005	.....Executive; administrative; personnel.
R007	.....Laws; regulations.
R007.1	.....Frequency allocation.
R007.9	.....International radio conferences; treaties.
R009	.....Reports; bulletins; intelligence reports.
R010	....Research.
R020	....Standards.
R030	....Terminology.
R031	....Symbols.
R032	....Definitions.
R040	....Lectures.
R050	....Publications.
R051	....Specifications.
R052	.....Textbooks; handbooks; instruction books; technical manuals.
R053	.....Periodicals.
R055	.....Bibliographies.
R060	....Societies; meetings.
R070	....Education; training.
R071	.....Engineer's relations with public; specialization.
R072	.....Research laboratories; experiment stations.

- R074Museums; exhibits.
- R078Accessories; slide rules; calculators.
- R080Collections; miscellanies.
- R081Tables.
- R082Nomograms; abacs.
- R084Maps and charts.
- R090History; reviews.
- R090.1Radio progress.
- R091Radiotelegraphy.
- R094Radiotelephony.
- R094.1Transmission.
- R094.2Reception.
- R095Television.
- R096Facsimile.
- R097Biography
- R100 ..RADIO PRINCIPLES. (Material having to do with underlying theory.)
- R110Radio Waves (propagation phenomena and theory; atmospherics).
- R111Theory (includes propagation at highest frequencies used).
 - R111.1Velocity of radio waves.
 - R111.2Radiation.
 - R111.6Reception.
 - R112Radio wave propagation (See also R113).
 - R112.1Ground-wave propagation.
 - R112.11Direct-wave propagation.
 - R112.111Refraction of ground wave.
 - R112.112Propagation of ground wave through ground and sea.
 - R112.12Surface-wave propagation.
 - R112.121Surface-wave propagation over land path.
 - R112.122Surface-wave propagation over sea path.
 - R112.123Surface-wave propagation over mixed land and sea paths.
 - R112.124Surface-wave propagation through jungles.
 - R112.125Surface-wave diffraction.
 - R112.126Surface-wave polarization.
 - R112.127Surface-wave tilt.
 - R112.13Ground-reflected wave propagation.
 - R112.131Ground reflection coefficients.
 - R112.131.1Brewster's angle.
 - R112.133Antenna vertical patterns.
 - R112.14Height-gain function for ground-wave propagation.
 - R112.15Multipath transmission of ground wave.
 - R112.16Absorption of ground wave in atmosphere.
 - R112.2Tropospheric-wave propagation.
 - R112.21Standard refraction of tropospheric wave.
 - R112.22Reflection of tropospheric wave from atmospheric inversions.
 - R112.23Superrefraction (anomalous propagation) of tropospheric wave.

R112.24 Atmospheric absorption of tropospheric wave.
R112.25 Effect of meteorological fronts on tropospheric wave.
R112.26 Meteorology of lower atmosphere as affecting tropospheric wave propagation.
R112.27 Height-gain function for tropospheric wave propagation.
R112.3 Guided-wave propagation.
R112.31 Guided-wave propagation at very low frequencies.
R112.32 Guided-wave propagation at low frequencies.
R112.33 Modes of guided-wave propagation.
R112.4 Sky-wave propagation.
R112.41 Ionosphere.
R112.42 Reflection and refraction of sky wave.
R112.43 Modes of sky-wave propagation.
R112.5 Skip distance and maximum usable frequency (muf).
R112.51 Oblique-vertical incidence relations for maximum usable frequency.
R112.52 Maximum usable frequency (muf).
R112.521 Maximum usable frequency by regular layers.
R112.522 Maximum usable frequency by irregular or sporadic reflection.
R112.523 Maximum usable frequency by long scatter.
R112.524 Maximum usable frequency by short scatter.
R112.525 Maximum usable frequency as affected by bursts.
R112.526 Maximum usable frequency as affected by spread echoes.
R112.53 Calculation of maximum usable frequency.
R112.531 Calculation of maximum usable frequency for single-hop propagation.
R112.532 Calculation of maximum usable frequency for multi-hop propagation.
R112.54 Prediction of maximum usable frequency.
R112.55 Transmission above maximum usable frequency.
R112.6 Sky-wave field intensities.
R112.61 Unabsorbed sky-wave field intensity.
R112.62 Ionospheric absorption of sky-wave field intensity.
R112.621 Ionospheric absorption of sky-wave field intensity for short distances.
R112.622 Ionospheric absorption of sky-wave field intensity for medium distances.
R112.623 Ionospheric absorption of sky-wave field intensity for long distances.
R112.624 Oblique-vertical incidence relations for ionospheric absorption.
R112.63 Sky-wave field intensity variations.
R112.631 Diurnal variations of sky-wave field intensity.
R112.632 Seasonal variations of sky-wave field intensity.

- R112.633 Long-time variations of sky-wave field intensity.
- R112.64 Prediction of sky-wave field intensities.
- R112.65 Radiated power as affecting sky-wave field intensity.
- R112.7 Propagation of atmospheric radio noise.
- R112.71 Source of atmospheric radio noise.
- R112.72 Diurnal variations of atmospheric radio noise.
- R112.73 Geographical variations of atmospheric radio noise.
- R112.74 Frequency variations of atmospheric radio noise.
- R112.75 Seasonal variations of atmospheric radio noise.
- R112.751 Atmospheric radio noise grades.
- R112.76 Required radio field intensities.
- R112.761 Atmospheric noise as affecting required radio field intensity.
- R112.763 Directional properties of antennas as affecting required radio field intensity.
- R112.8 Lowest useful high frequency (luhf).
- R112.9 Polarization of sky waves.
- R112.91 Ordinary-wave polarization.
- R112.92 Extraordinary-wave polarization.
- R112.93 Downcoming-wave polarization.
- R112.94 Ground reflection phenomena.
- R112.95 Effect of ionosphere on polarization.
- R113 Radio wave propagation (continued), (See also R112).
- R113.1 Fading.
- R113.101 Interference fading.
- R113.102 Polarization fading.
- R113.103 Absorption fading.
- R113.104 Flutter fading.
- R113.105 Skip fading.
- R113.106 Sunrise-sunset fading.
- R113.107 Selective fading.
- R113.108 Rayleigh distribution of field intensities.
- R113.109 Scintillations of field intensities.
- R113.110 Multipath transmission fading.
- R113.111 Shadows of objects.
- R113.2 Propagation variations.
- R113.21 Skip distance and maximum usable frequency (muf).
- R113.211 Diurnal variations.
- R113.212 Seasonal variations.
- R113.213 Latitude variations.
- R113.214 Longitude variations.
- R113.215 Annual variations.
- R113.216 Solar cycle variations.
- R113.217 Random variations.
- R113.218 Prediction of skip distance and muf.
- R113.22 Field intensity and ionospheric absorption.
- R113.221 Diurnal variations of field intensity and ionospheric absorption.

R113.222	.....Seasonal variations of field intensity and ionospheric absorption.
R113.223	.....Latitude variations of field intensity and ionospheric absorption.
R113.224	.....Longitude variations of field intensity and ionospheric absorption.
R113.225	.....Annual variations of field intensity and ionospheric absorption.
R113.226	.....Solar cycle variations of field intensity and ionospheric absorption.
R113.227	.....Random variations of field intensity and ionospheric absorption.
R113.228	.....Prediction of field intensity and ionospheric absorption.
R113.23	.....Tropospheric wave variations.
R113.230.1	.....Diurnal variations of tropospheric wave.
R113.230.2	.....Seasonal variations of tropospheric wave.
R113.230.3	.....Latitude variations of tropospheric wave.
R113.230.4	.....Longitude variations of tropospheric wave.
R113.230.5	.....Annual variations of tropospheric wave.
R113.230.6	.....Solar cycle variations of tropospheric wave.
R113.230.7	.....Random variations of tropospheric wave.
R113.230.8	.....Prediction of tropospheric wave variations.
R113.230.9	.....Standard refraction of tropospheric wave.
R113.231.0	.....Superrefraction of tropospheric wave.
R113.231.1	.....Atmospheric absorption of tropospheric wave.
R113.231.2	.....Meteorological effects on tropospheric wave.
R113.24	.....Irregularities of radio wave propagation.
R113.241	.....Sudden ionosphere disturbances.
R113.242	.....Scatter.
R113.242.1	.....Short scatter.
R113.242.2	.....Long scatter.
R113.242.3	.....Auroral zone scatter.
R113.243	.....Ionosphere storms.
R113.244	.....Sporadic E reflection.
R113.245	.....Cross modulation in ionosphere.
R113.246	.....Cross modulation of radio waves by objects.
R113.25	.....Doppler effect on radio wave propagation.
R113.3	.....Directional variations of radio wave propagation.
R113.301	.....Non-great-circle propagation.
R113.302	.....Vertical angles of arrival.
R113.303	.....Heilitag effect.
R113.304	.....Direction-finder errors.
R113.305	.....Ionosphere layer tilt.
R113.306	.....Reflections from ionosphere clouds.
R113.307	.....Reflections from objects.
R113.308	.....Scattering.
R113.309	.....Auroral-zone reflections.
R113.4	.....Solar and cosmic effects on radio wave propagation.

R113.401 Normal ionizing radiation effect on radio wave propagation.
R113.402 Sunspots effect on radio-wave propagation.
R113.403 Solar-cycle variations.
R113.404 Solar corona.
R113.405 Solar flocculi and faculae.
R113.406 Solar prominences.
R113.407 Solar flares.
R113.408 Ultra-violet radiation from sun, effect on radio wave propagation.
R113.409 Corpuscular radiation from sun, effect on radio wave propagation.
R113.409.1 Charged corpuscles from sun, effect on radio wave propagation.
R113.409.2 Neutral corpuscles from sun, effect on radio wave propagation,
R113.410 Lunar effects on radio wave propagation.
R113.411 Solar radio noise.
R113.412 Eclipses.
R113.413 Cosmic radiation, effect on radio wave propagation.
R113.414 Cosmic noise.
R113.415 Meteors and meteoric matter.
R113.5 Geophysical effects on radio wave propagation.
R113.501 Meteorological effects on radio wave propagation.
R113.501.1 Meteorological effects on tropospheric propagation.
R113.501.2 Meteorological effects on atmospheric radio noise.
R113.501.3 Meteorological effects on ionosphere.
R113.502 Constitution of atmosphere.
R113.502.1 Ionization processes in atmosphere.
R113.502.2 Recombination processes in atmosphere.
R113.502.3 Light of night sky.
R113.502.4 Causes of ionosphere layer formation.
R113.502.41 Ozone layer of atmosphere.
R113.502.42 D layer of atmosphere.
R113.502.43 E layer of atmosphere.
R113.502.44 F1 layer of atmosphere.
R113.502.45 F2 layer of atmosphere.
R113.502.46 Sporadic-E layer of atmosphere.
R113.502.49 Other layers of atmosphere.
R113.503 Ionosphere storms.
R113.503.1 Auroral zone.
R113.503.2 Auroras.
R113.503.3 Magnetic storms.
R113.503.4 Earth current variations.
R113.503.5 Radio propagation disturbances.
R113.503.6 Recurrence effects.
R113.504 Sudden ionosphere disturbances.

R113.505	.....Latitude variations of ionosphere.
R113.506	.....Longitude variations of ionosphere.
R113.507	.....Geomagnetic variations of ionosphere.
R113.509	.....Ground constants.
R113.6	.....Ionosphere.
R113.601	.....Description of ionosphere.
R113.602	.....Characteristics of ionosphere.
R113.602.1	.....Critical frequency of ionosphere.
R113.602.2	.....Heights of ionosphere.
R113.602.21	.....Virtual height of ionosphere.
R113.602.22	.....Actual height of ionosphere.
R113.602.3	.....Ion distribution in ionosphere.
R113.602.4	.....Reflection coefficients of ionosphere.
R113.602.5	.....Maximum usable frequencies (muf) and skip distance.
R113.602.6	.....Maximum usable frequency factors.
R113.602.7	.....Absorption and reflection coefficients.
R113.602.8	.....Lowest usable high frequency (luhf).
R113.602.9	.....Polarization.
R113.603	.....F1 layer of ionosphere.
R113.604	.....F2 layer of ionosphere.
R113.605	.....E layer of ionosphere.
R113.606	.....E2 layer of ionosphere.
R113.607	.....D layer of ionosphere.
R113.608	.....Sporadic-E layer of ionosphere.
R113.609	.....Sporadic E2 layer of ionosphere.
R113.610	.....Stratification of ionosphere.
R113.611	.....Other layers of the ionosphere.
R113.612	.....Polar spur on ionosphere records.
R113.613	.....Magneto-ionic effects on ionosphere.
R113.613.1	.....Magneto-ionic effects on ordinary wave propagation.
R113.613.2	.....Magneto-ionic effects on extraordinary wave propagation.
R113.613.3	.....Magneto-ionic effects on "2" wave propagation.
R113.614	.....Gyrofrequency for radio waves.
R113.615	.....Normal variations of ionosphere.
R113.615.1	.....Diurnal variations of ionosphere.
R113.615.2	.....Seasonal variations of ionosphere.
R113.615.3	.....Solar cycle variations of ionosphere.
R113.615.6	.....Random day-to-day variations of ionosphere.
R113.616	.....Predictions of ionosphere conditions.
R113.616.1	.....Critical frequencies of ionosphere.
R113.616.2	.....Heights of ionosphere.
R113.616.3	.....Muf and skip distance for sky-wave propagation.
R113.616.4	.....Absorption in sky-wave propagation.
R113.616.5	.....Luhf for sky-wave propagation.
R113.617	.....Anomalies and disturbances of ionosphere.

R113.617.2	.....Forecasting of ionosphere storms.
R113.617.4	.....Lower layer absorption.
R113.617.5	.....Scatter.
R113.617.51	.....Long scatter.
R113.617.52	.....Short scatter.
R113.617.53	.....Auroral zone scatter.
R113.617.6	.....Bursts in ionosphere.
R113.617.7	.....Spread schoes from ionosphere.
R113.617.8	.....Ionosphere layer tilt.
R113.65	.....Ionosphere projects.
R113.7	.....Calculation of propagation conditions.
R113.71	.....Handbooks on propagation conditions.
R113.72	.....Sets of graphs on propagation conditions.
R113.73	.....Nomograms on propagation conditions.
R113.74	.....Tables on propagation conditions.
R113.75	.....Transmission formulas and radio propagation.

Add following numbers to any of classes of R113.7 group to indicate frequency ranges. (Example, R113.721 Set of graphs for very low frequencies.)

R113

.001	.....Very low frequencies (below 30 kc).
.002	.....Low frequencies (30 to 300 kc).
.003	.....Medium frequencies (300 to 3000 kc).
.004	.....High frequencies (3000 to 30,000 kc).
.005	.....Very high frequencies (30 to 300 Mc).
.006	.....Ultra-high frequencies (300 to 3000 Mc).
.007	.....Super-high frequencies (3000 to 30,000 Mc and above).
R114	.....Atmospheric radio noise.
R114.1	.....Atmospheric radio noise sources.
R114.11	.....Diurnal variations in atmospheric radio noise.
R114.12	.....Seasonal variations in atmospheric radio noise.
R114.13	.....Geographical variations in atmospheric radio noise.
R114.14	.....Meteorological variations, effect on atmospheric radio noise.
R114.3	.....Calculation of atmospheric radio noise.
R114.4	.....Prediction of atmospheric Radio noise.
R114.5	.....Precipitation radio noise, (static).
R114.6	.....Whistlers.
R114.7	.....Required field intensities to overcome atmospheric radio noise.
R114.8	.....Effects of receiving antennas on atmospheric radio noise.
R115	.....Directional properties of radio waves.
R115.1	.....Great-circle path calculations of radio waves.

R115.11	.....Distance calculations.
R115.12	.....Bearing and azimuth calculations.
R115.2	.....Non-great-circle path propagation of radio waves.
R115.21	.....Ionosphere layer tilt effect on propagation.
R115.22	.....Reflections of radio waves from ionosphere clouds.
R115.23	.....Reflections of radio waves from objects.
R115.24	.....Long scatter of radio waves.
R115.25	.....Short scatter of radio waves.
R115.26	.....Auroral scatter of radio waves.
R115.3	.....Bearing deviations of radio waves.
R115.31	.....Long-route bearings.
R115.32	.....Scatter as cause of bearing deviations.
R115.33	.....Ionosphere storm effects on bearing deviations.
R115.34	.....Sporadic-E effects on bearing deviations.
R115.35	.....Heiligtag effects on bearing deviations.
R115.36	.....Polarization effects on bearing deviations.
R115.361	.....Night effects on bearings.
R115.4	.....Vertical angles of arrival of radio waves.
R115.5	.....Ground reflection effects of radio waves.
R115.6	.....Radio wave tilt.
R115.7	.....Polarization effects on directional properties of radio waves.
R116	.....Radar principles.
R117	.....Waves on wires; transmission lines; parallel wires or concentric conductors.
R117.1	.....Properties of transmission lines.
R117.11	.....Conduction of r-f and a-f by transmission lines.
R117.111	.....Non-resonant lines.
R117.112	.....Resonant lines.
R117.12	.....Impedance and impedance matching.
R117.121	.....Impedance matching by network.
R117.122	.....Impedance matching by resonant line coupling.
R117.123	.....Impedance matching by quarter-wave coupling line.
R117.124	.....Impedance matching by stub-line.
R117.125	.....Impedance matching by reentrant transmission line section.
R117.13	.....Irregularities in transmission lines.
R117.14	.....Balanced and unbalanced lines.
R117.15	.....Radiation from transmission lines.
R117.16	.....Loaded lines.
R117.17	.....Tapered lines.
R117.18	.....Pressurizing r-f lines.
R117.19	.....Delay lines.
R117.2	.....High-frequency cable; coaxial lines; coaxial cable.
R117.3	.....Transmission line terminations.
R118	.....Wave guides.

- R118.1Rectangular wave guides.
- R118.2Nonrectangular wave guides.
- R118.3Transverse magnetic waves, TM or E.
- R118.4Transverse electric waves, TE or H.
- R118.5Cut-off frequency of wave guides.
- R118.6Excitation of modes of wave guides.
- R118.7Attenuation of wave guides.
- R119Cavity resonators.
- R119.1Nonreentrant-type cavity resonator.
- R119.2Reentrant-type cavity resonator.
- R119.3Properties of cavity resonators.
- R119.31Modes of oscillation of cavity resonator.
- R119.32Resonance frequency of cavity resonator.
- R119.33Q of cavity resonator.
- R119.34Impedance of cavity resonator.
- R119.35Coupling to cavity resonator.
- R119.39Other properties of cavity resonators.
- R120Antennas (See also R320); antenna radiation.
- R120.1Vertical directional patterns of antennas.
- R120.11Ground reflection as affecting vertical directional patterns of antennas.
- R120.2Radiation efficiency of antennas.
- R120.21Radiated power from antennas.
- R121Condenser type antennas (ordinary elevated type) with ground or the usual type counterpoise.
- R122Linear antennas - not connected to ground or to the ordinary type of counterpoise.
- R125Directional antennas (transmitting in, or receiving from, a particular direction).
- R125.1Beam antennas, antenna arrays.
- R125.2Wave antennas.
- R125.3Coil antennas.
- R125.31Direction-finding antennas.
- R125.4Adcock antennas.
- R125.5Transmission-line antennas.
- R125.6Vertically radiating antennas.
- R125.61Resonant radiating antennas.
- R125.62Nonresonant radiating antennas.
- R125.7High-angle antennas for short-distance work.
- R125.8Low-angle antennas for long-distance work.
- R126Ground systems.
- R127Image antennas.
- R128Feeders for antennas (transmission lines, etc.).
- R129Other types of antennas (quarter-wave antennas; half-wave antennas).
- R129.1Multiple-tuned antennas.
- R130Vacuum tubes.
- R131General properties; characteristic curves of vacuum tubes.

- R132Amplifying action of vacuum tube; amplifier theory.
- R133Generating action of vacuum tube.
- R133.1Generating action of vacuum tube with negative grid.
- R133.2Generating action of vacuum tube with positive grid.
- R133.3Generating action of vacuum tube, relaxation oscillation.
- R134Detector action of vacuum tube.
- R135Modulating action of vacuum tube.
- R136Trigger action in vacuum tube.
- R138Electron emission; ionization; electron theory.
- R138.1Space charge effects in vacuum tube.
- R138.2Shot effect.
- R138.3Electron optics.
- R138.31Cathode-ray tubes.
- R138.311Electron gun.
- R138.312Deflection of electron beam.
- R138.313Fluorescent screen.
- R138.4Electron oscillations.
- R138.5Electron transit-time.
- R138.6Thermal noise.
- R139Other vacuum-tube principles.
- R139.1Vacuum-tube circuit analysis.
- R139.2Special vacuum-tube circuit arrangements.
- R139.21Cathode follower circuit.
- R139.22Voltage-doubler circuit.
- R139.23Squelch circuit.
- R140Circuit theory and effects; transient effect; relaxation oscillations; parasitic oscillations.
- R141Radio circuits.
- R141.1Frequency of radio circuit.
- R141.11Frequency drift in radio circuits.
- R141.2Resonance, tuning of radio circuit; slug tuning.
- R141.21Series resonance of radio circuit.
- R141.22Parallel resonance of radio circuit.
- R141.23Time constant of radio circuit.
- R141.24Inductive-tuned circuit.
- R141.3Impulse excitation.
- R141.4Relaxation oscillations.
- R141.5Parasitic oscillations.
- R142Coupled circuits.
- R142.1Direct coupling.
- R142.3Inductive coupling.
- R142.5Capacitive coupling.
- R143Networks.
- R143.1Resistance-type attenuators.
- R143.2Filters.

- R143.3
- R143.4
- R143.5
- R144
- R144.1
- R144.2
- R145
- R145.3
- R145.5
- R146
- R146.1
- R146.2
- R146.3
- R147
- R148
- R148.1
- R148.11
- R148.12
- R148.13
- R148.14
- R148.15
- R148.16
- R148.17
- R148.18
- R148.19
- R148.2
- R148.3
- R148.4
- R148.41
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R365.3Recorders.
R365.31Time-signal recorder.
R365.32Signal-intensity recorder.
R365.33Ionosphere recorders.
R365.331Manual ionosphere recorder.
R365.332Fixed-frequency ($h^f t$) recorder.
R365.333Multifrequency ($h^f f$) recorder.
R365.334Absorption recorder.
R365.335Scatter recorder.
R365.34Radio-frequency recorder.
R365.35Magnetic recorder.
R365.36Meteorological recorder.
R365.37Wave direction recorder.
R366Radio receiver power supply.
R366.1Direct-current power supply.
R366.11Power-line supply.
R366.12Batteries.
R366.13Vibrators.
R366.14Generators.
R366.15Regulated d-c voltage supply.
R366.151Electronic voltage regulator.
R366.152Neon-tube regulator.
R366.153Ballast-resistance regulator.
R366.2Alternating-current power supply.
R366.2125-60 cycle power line.
R366.22Rotary dc to ac.
R366.23A-c voltage regulator.
R366.24D-c to a-c by electronic means.
R366.231Magnetic saturation regulator*.
R366.3Rectifiers.

R366.31	.....Rotary ac to dc rectifier.
R366.32	.....Vacuum-tube rectifier.
R366.33	.....Vibrator-type rectifier.
R366.34	.....Copper-oxide rectifier.
R366.35	.....Selenium rectifier.
R366.36	.....Magnesium-copper sulphide rectifier.
R366.37	.....Rectifier filters.
R367	....Remote control of radio receiving equipment.
R370	....Instruments.
R371.1	.....Wave analyzer.
R371.11	.....Heterodyne-type wave analyzer.
R371.2	.....Spectrum analyzer.
R371.3	.....Time-interval meter.
R371.4	.....Q-meter; cavity Q-meter.
R371.5	.....Cathode-ray oscillograph; oscilloscope.
R371.51	.....Electronic switch.
R371.6	.....Range calibrator.
R371.7	.....Standing-wave indicator.
R372	....Electrical indicating instruments.
R372.1	.....Ohmmeter, volt-ohmmeter.
R372.2	.....Radio set analyzer; condenser analyzer.
R374	....Frequency meters; frequency standards.
R374.1	.....Radio-frequency meter.
R374.11	.....Absorption-type frequency meter.
R374.111	.....Cavity-type frequency meter.
R374.112	.....Echo box.
R374.12	.....Generating-type frequency meter.
R374.121	.....Buzzer-driven frequency meter.
R374.122	.....Heterodyne-type frequency meter.
R374.123	.....Dynatron-type frequency meter.
R374.124	.....Frequency monitor.
R374.2	.....Audio-frequency meter.
R374.21	.....Tuned-circuit frequency meter.
R374.22	.....Beat-frequency meter.
R374.23	.....Electronic-type a-f meter.
R374.5	....Decremeter.
R380	....Component parts.
R381	....Capacitors.
R381.1	.....Fixed capacitors.
R381.11	.....Mica capacitors.
R381.12	.....Ceramic capacitors.
R381.13	.....Air capacitors.
R381.14	.....Electrolytic capacitors.
R381.15	.....Paper capacitors.
R381.16	.....Vacuum capacitors.
R381.2	.....Variable capacitors.
R381.21	.....Variable air capacitors.
R381.22	.....Padder capacitors.

R382 Inductors.
R382.1 Transformer's for communications equipment.
R382.11 Radio-frequency transformers; IF transformers;
triple-stub transformers.
R382.12 Audio-frequency transformers.
R382.13 Pulse transformers.
R382.2 Choke coils.
R382.21 RF choke coils.
R382.22 AF choke coils.
R383 Resistors.
R383.1 Fixed resistors.
R383.11 Wire-wound resistors.
R383.12 Composition resistors.
R383.121 Carbon resistors.
R383.122 Metallized resistors.
R383.2 Variable resistors.
R383.21 Attenuator network.
R383.22 Impedance-matching network.
R383.23 Decade resistance box.
R385 Modulation and keying devices.
R385.1 Keys.
R385.2 Buzzers.
R385.3 Interruptors (tone wheels, choppers).
R385.4 Vacuum-tube modulation devices.
R385.5 Microphones.
R385.51 Carbon microphone.
R385.52 Dynamic or moving-coil type microphone.
R385.53 Condenser microphone.
R385.54 Unidirectional ribbon microphone.
R385.55 Velocity-type ribbon microphone.
R385.56 Piezoelectric (crystal) microphone.
R385.57 Polydirectional microphone.
R385.59 Other speech equipment.
R386 Filters.
R386.1 Band-pass filter.
R386.2 Low-pass filter.
R386.21 Scratch-eliminator filter.
R386.3 High-pass filter.
R386.4 Band-eliminator filter.
R386.41 Power-line noise-eliminator filter.
R386.5 Piezoelectric (crystal) filter.
R386.6 Power-pack-type filter.
R387 Protective equipment.
R387.1 Shields.
R387.5 Grounds.
R387.7 Insulators.
R389 Other components.
R389.1 Relays.
R389.11 Plug-in relay.
R389.12 Small-switching relay.

- R389.13 Small-telephone-type relay.
- R389.14 Stepping relay.
- R389.15 Time-delay relay.
- R389.16 Transmitter-switching and keying relay.
- R389.17 Vacuum relay.
- R389.18 Overload relay.
- R390 Other radio apparatus and equipment (public-address systems).
 - Public-address systems.
 - Phonographic recorder.
 - Transcription turn tables.
 - Phonographic pickup.
 - Volume indicators.
 - Attenuators.
 - Resistance-type attenuator.
 - Mutual inductance type attenuator.
 - Mutual capacitance type attenuators.
 - Miscellaneous types of attenuators.
- R400 .. RADIO COMMUNICATION SYSTEMS (Complete communication systems, or parts of a system which are considered in relation to the complete system).
 - Damped-wave (transmitting) systems.
 - Spark communication system.
 - Timed-spark communication system.
 - Impulse-excitation communication system.
 - Continuous-wave (transmitting) systems.
 - High-frequency alternator.
 - Alexanderson alternator.
 - Goldschmidt alternator.
 - Static-frequency multiplier.
 - Arc communication system.
 - Vacuum-tube systems (transmitting); frequency-shift transmitter.
 - Very low-frequency system (below 30 kc).
 - Low-frequency system (30 to 300 kc).
 - Medium-frequency system (300 to 3000 kc).
 - Broadcast-frequency system (550 to 1600 kc).
 - Synchronization of broadcast stations.
 - High-frequency system (3000 to 30,000 kc).
 - Very high-frequency system (30 to 300 Mc).
 - Ultra-high-frequency system (300 to 3000 Mc).
 - Super-high-frequency system (3000 to 30,000 Mc and higher).
 - Telegraph code transmitters.
 - Frequency diversity transmitter.
 - Space diversity transmitter.
 - Polarization diversity transmitter.
 - Variable-carrier transmitter
 - Suppressed-carrier transmitter.

- R^h23.5 Single side-band (asymmetric or vestigial side-band) transmitter.
- R^h23.51 Single side-band by filter system.
- R^h23.52 Single side-band by phase-shift system.
- R^h23.6 Single side-band plus carrier transmitter.
- R^h23.7 Amplitude-modulation transmitter.
- R^h23.8 Frequency-modulation transmitter.
- R^h23.81 Armstrong system of FM.
- R^h23.82 Automatic frequency-control system of FM.
- R^h23.83 Morrison system of FM.
- R^h23.9 Secrecy equipment.
- R^h24 Pulse communication.
- R^h26 Beat reception.
- R^h27 Use of receiving interruptors and tone wheels.
- R^h28 Diversity receiving systems.
- R^h29 Other continuous-wave systems.
- R^h30 Interference elimination.
- R^h30.1 Radio interference.
- R^h30.11 Station interference.
- R^h30.2 Man-made electrical interference.
- R^h30.21 Power-line interference.
- R^h30.22 Household-appliance interference.
- R^h30.23 Therapeutic-appliance interference.
- R^h30.231 Diathermy interference.
- R^h30.232 Electrosurgical-appliance interference.
- R^h30.232.1 Spark electrosurgical-appliance interference.
- R^h30.232.2 Vacuum-tube electrosurgical-appliance interference.
- R^h30.24 Automobile-ignition interference (see also R521.2 aircraft ignition shielding).
- R^h30.25 Industrial-heating equipment interference.
- R^h40 Remote control (by wire).
- R^h450 Connection of radio systems to wire systems (vodas).
- R^h450 Duplex and multiplex systems.
- R^h470 Radio-frequency carrier wire systems.
- R^h480 Radio relay systems.
- R^h490 Other systems.
- R500 ..APPLICATIONS OF RADIO (Radio as an instrument in other arts, fields, industries, etc.).
 - R501 Direction finding systems and equipment.
 - R501.1 Marine direction finding.
 - R501.2 Aeronautic direction finding.
 - R510 Marine applications of radio.
 - R511 Marine distress signals.
 - R512 Radio marine navigation aid systems.
 - R512.1 Marine position finding.
 - R512.11 Marine radio beacons.
 - R512.12 Marine fog signalling.

- R512.13 Marine radio compass (direction finding).
- R512.14 Marine distance finding.
- R512.2 Long-range navigation system, Loran.
- R512.3 Marine collision prevention.
- R513 Fishing boats.
- R514 Tow-boat devices.
- R515 Submarine signalling.
- R516 Marine life-saving service.
- R517 Lighthouse service.
- R518 Ship communication equipment.
- R520 Aeronautic applications of radio.
- R521 Receiving on aircraft.
- R521.1 Receiving sets for aircraft.
- R521.2 Ignition shielding on aircraft.
- R521.3 Static suppressors for aircraft.
- R522 Transmitting from aircraft.
- R522.1 Transmitters for aircraft.
- R522.2 Bonding of aircraft.
- R523 Receiving from aircraft.
- R524 Transmitting to aircraft.
- R525 Airplane antennas (See also R326.21).
- R526 Radio as navigation aid to aircraft.
- R526.1 Beacon systems for aircraft.
- R526.11 Equi-signal beacon system (radio range).
- R526.111 Coded beacon system.
- R526.112 Audio-modulated beacon system.
- R526.113 Simultaneous-phone beacon system.
- R526.114 Course-identification beacon system.
- R526.12 Omni-directional beacon system.
- R526.13 Non-directional beacon system (for direction finding).
- R526.14 Timed-rotating beacon system.
- R526.15 Beacon-system markers.
- R526.151 Beacon-system route marker.
- R526.152 Beacon-system obstruction marker.
- R526.153 Beacon-system fan marker.
- R526.154 Beacon-system cone of silence marker.
- R526.2 Instrument landing of aircraft.
- R526.21 Instrument-landing beam.
- R526.22 Instrument-landing marker.
- R526.23 Instrument-landing runway-localizer.
- R526.3 Direction finders for aircraft.
- R526.4 Collision-prevention devices for aircraft.
- R526.5 Radio altimeters for aircraft.
- R527 Automatic control of aircraft.
- R528 Aeronautic communications.
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- R531 Traffic.
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- R531.2 Station call letters.
- R531.3 Abbreviations.
- R531.4 Alphabets, Morse and Continental (international) code.
- R531.5 Traffic relations with land lines.
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- R531.8 Operating data for radio propagation analysis.
- R531.81 Traffic logs.
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- R531.83 Figures of merit on traffic circuits.
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- R532 Press services.
- R533 Railroad communications.
- R534 Radio applications in agriculture.
- R535 Radio applications in forestry.
- R536 Radio applications in mining and geophysical prospecting.
- R537 Radar.
- R537.1 Radar sets.
- R537.11 Radar antenna and scanning mechanism.
- R537.12 Radar transmitter.
- R537.121 Radar r-f oscillator.
- R537.122 Radar modulator.
- R537.13 Radar receiver.
- R537.131 Radar indicator; PPI (plan-position indicator).
- R537.2 Radar beacons.
- R537.3 Radar power.
- R537.4 Radar tests.
- R537.9 Radar countermeasures.
- R538 Police radio.
- R538.1 Radio applications in Department of Justice.
- R538.2 Radio applications in prisons.
- R538.3 State and county police radio.
- R538.4 City and metropolitan police radio.
- R539 Miscellaneous radio services.
- R539.1 Data exchange by radio.
- R539.11 Synoptic code systems for data exchange.
- R539.12 Cipher systems for data exchange.
- R540 Utilities, special services.
- R541 Use of radio by public utilities.
- R542 General mobile radio, taxicab radio.
- R543 Fire-service radio.
- R544 Citizens radio communications (walkie-talkie).

- R545Amateur radio.
- R546Rural radio telephone.
- R547Use of radio in special emergency services.
- R547.1Doctor's radio call service.
- R547.2Citizens' alerting system.
- R549Other special services.
- R550Broadcasting.
- R551Time signals.
- R551.1Longitudinal determinations.
- R553Meteorological radio signals.
- R553.1Radio meteorographs (radiosondes).
- R553.2Reemitters.
- R663.21Raywind.
- R553.3Storm locator system.
- R555Standard frequency signals.
- R557Education by radio.
- R560Military radio.
- R560.1Mine detection.
- R560.2Proximity fuze.
- R561Army radio.
- R565Navy radio.
- R565.1Sonar.
- R568Coast Guard radio.
- R570Remote control by radio.
- R570.1Remote control of aircraft.
- R570.2Remote control of marine craft.
- R570.3Remote control of land craft.
- R570.4Remote control of missiles (See also R560).
- R570.5Remote control of radio at a fixed point.
- R580Picture transmission (television); teletype.
- R581Facsimile (including photographs).
- R582Motion pictures.
- R583Television; television relay systems.
- R583.1Basic theory of television.
- R583.11Television image analysis.
- R583.12Television camera action.
- R583.13Scanning beam formation, deflection and synchronization.
- R583.14Video signal amplification and transmission.
- R583.15Television image reproduction.
- R583.16Television propagation and coverage.
- R583.17Television progress and plans.
- R583.2Television studio technique.
- R583.3Television studio equipment.
- R583.4Television transmitters.
- R583.5Television receivers.
- R583.6Television tubes.
- R583.7Television reception.
- R584Teletype.

- R590Other applications of radio.
- R591Transmission of power by radio.
- R593Musical instruments.
- R594Therapeutics.
- R594.1Diathermy.
- R594.11Condenser field application of diathermy.
- R594.12Induction field application of diathermy.
- R594.2Electrosurgery.
- R594.21Surgeon's metal locator.
- R594.3Electrocardiography.
- R594.4Hearing aids.
- R596Use of radio in engineering construction.
- R596.1Use of radio in surveying.
- R597Burglar alarms, detection and/or location of objects.
- R597.1Burglar alarm.
- R597.2Buried metal locator (see also R536).
- R598Industrial heating by r-f currents.
- R600 ..RADIO STATIONS: EQUIPMENT, REGULATIONS, DESIGN, OPERATION, MANAGEMENT, AND MAINTENANCE.
 - R610Radio station equipment.
 - R611Very low-frequency station (below 30 kc).
 - R612Low-frequency station (30-300 kc).
 - R613Medium-frequency station (300-3000 kc).
 - R613.1Broadcast frequency station (550-1600 kc).
 - R613.11Radio broadcast studios.
 - R613.111Studio acoustics.
 - R614High-frequency station (3000 to 30,000 kc).
 - R615Very high-frequency station (30-300 Mc).
 - R616Ultra-high frequency station (300 to 3000 Mc).
 - R617Super-high-frequency station (3000 to 30,000 Mc and higher).
 - R618Ship radio stations.
 - R620Radio station regulations, design, operation, maintenance and management.
 - R621Regulations for radio stations.
 - R621.1Radio station construction applications and permits.
 - R621.2Radio station licenses.
 - R621.21Radio station operator's licenses.
 - R621.3Radio station lists.
 - R622Radio station design and planning.
 - R622.1Radio station site selection.
 - R623Radio station operation.
 - R624Radio station maintenance.
 - R625Radio station management.
 - R630Frequency modulation broadcasting (FM)
 - R630.1Theory of frequency modulation.
 - R630.11Frequency modulation propagation and coverage.
 - R630.12Frequency modulation progress and plans.

R630.2Frequency modulation stations.
R630.22Frequency modulation studio equipment.
R630.23Frequency modulation studio-transmitter links.
R630.24Frequency modulation networks.
R630.3Frequency modulation systems performance.
R700 ..RADIO MANUFACTURING AND REPAIRING.
R710Factories.
R720Processes, factory methods; production methods.
R730Radio servicing and repairing.
R740Sales, merchandizing.
(R800)* ..NON-RADIO SUBJECTS (material of interest, but not a part of radio).
347.7Patent service.
353.821*National Bureau of Standards.
383Postal service, air mail service (See also Aeronautics 629.13).
507.2General Science.
510Mathematics.
520Astronomy.
523.74Sun spots.
523.78Eclipses of the sun.
525Earth.
526Geodesy.
526.8Map projections.
529.78Instruments for measuring time (watches, clocks).
530Physics.
531Mechanics.
532Liquids, hydrostatics.
533Gases, pneumatics.
533.85Vacuum apparatus.
534Sound.
534.3Tuning forks.
534.83Signals in navigation.
535Light (Light signaling see 623.731).
535.3Photo-electric phenomena.
535.38*Photo-electric tubes; cells and applications; Kerr cell; selenium cell.
536Heat.
536.33Radiation; general theory; thermal detector.
536.83Heating by induction.
537Electricity.
537.1Theory of electricity, A.C. theory.
537.23Electrostatic generators.
537.26*Corona discharge.
537.4Lightning.
537.6Electrodynamics.
537.65*Piezoelectric phenomena. (See also R191, R214, R355.65, and R355.911.41).

The numbers marked with an asterisk () are not found in the Dewey decimal classification, but are inserted here for convenience.

537.67* Differential plotting of electrical fields.
537.7 X-ray analysis.
537.87 Physiological electrical phenomena.
538 Magnetism.
538.11* Magnetostriiction.
539 Molecular physics; atomic physics.
539.7 Radioactivity.
540 Chemistry.
541.3 Physical chemistry.
550 Geology.
551.5 Weather; meteorology.
551. Mechanical engineering.
551.3 Electrical engineering.
621.313 Electric generators; electric motors.
621.313.2 Direct-current machinery.
621.313.23 Direct-current generators.
621.313.24 Direct-current motors.
621.313.25 Motor generators.
621.313.26 Dynamotors.
621.313.3 Alternating-current machinery.
621.313.43 Alternating-current generators.
621.313.44 Synchronous motors.
621.313.63 Induction motors.
621.313.66 Repulsion motors.
621.313.68 Phase converter or adaptor.
621.313.7 Rectifiers.
621.314.3 Transformers.
621.314.5 Voltage regulators.
621.314.51 Voltage control equipment.
621.314.6 Choke coils.
621.314.7 Induction coils.
621.317 Switchboards.
621.317.3 Switches.
621.317.4 Rheostats.
621.319.2 Transmission lines.
621.325 Incandescent arcs.
621.326 Incandescent filament lamps.
621.327.4 Mercury vapor tubes (lamps).
621.327.7 X-ray tubes.
621.353 Batteries, primary.
621.354 Batteries, secondary (storage).
621.354.7 Battery-charging devices.
621.37 Electrical measurements, meters and testing.
621.371 General.
621.372 Standards, calibration of instruments.
621.373 Meters. General types.
621.374 Special meters and measurements.
621.374.2 Wheatstone bridges, ohmmeters, resistance boxes, inductance, capacitance.

621.374.3 Voltmeters, electrometers, standard cells, volt-ohmmeters; potentiometers.

621.374.4 Current, galvanometers, ammeters, coulometers, ampere-hour meters.

621.374.5 Watt-hour meters.

621.374.6 Wattmeters.

621.374.7 Frequency meters. Oscillographs.

621.374.9 Other meters and measurements.

621.374.91 Phase meters. Power-factor meters.

621.375* Synchronizers.

621.375.1 Electronics, vacuum tubes, special applications other than radio.

621.375.101 Control of conditions.

621.375.102 Electric load; electric current.

621.375.103 Humidity, moisture content.

621.375.104 Illumination.

621.375.105 Motion; servomechanisms.

621.375.106 Pressure.

621.375.107 Switching.

621.375.108 Synchronization.

621.375.109 Temperature.

621.375.113 Traffic.

621.375.131 Control of devices.

621.375.132 Doors.

621.375.133 Elevator levelling.

621.375.15 Motors.

621.375.151 Control of processes.

621.375.152 Chemical.

621.375.153 Combustion.

621.375.154 Electroplating.

621.375.2 Welding.

621.375.3 Counting process; analysis; computing.

621.375.31 Grading, sorting process.

621.375.4 Flaw detection.

621.375.41 Heating control.

621.375.42 Food sterilization, dehydration.

621.375.43 Gluing.

621.375.44 Metal hardening, tempering.

621.375.45 Plastics industry.

621.375.5 Wood drying.

621.375.6 Ignition systems.

621.375.601 Measurements, tests.

621.375.602 Color.

621.375.603 Conductivity of solutions.

621.375.604 Density, opacity.

621.375.605 Electron microscope.

621.375.606 Gas detection and analysis.

621.375.606 Hardness.

- 621.375.607 Light intensity.
- 621.375.608 Metallurgy, cyclograph.
- 621.375.609 Miscellaneous chemical tests.
- 621.375.610 pH determination.
- 621.375.611 Photography (high-speed).
- 621.375.612 Reflection; coefficient meter.
- 621.375.613 Smoke detection, recording.
- 621.375.614 Speed, velocity.
- 621.375.615 Strain.
- 621.375.616 Televetering.
- 621.375.617 Thickness.
- 621.375.618 Time.
- 621.375.619 Titration.
- 621.375.620 Turbidity.
- 621.375.621 Vacuum and ionization gages.
- 621.375.622 Vibration.
- 621.375.623 X-rays.
- 621.375.624 Fluxmeter, magnetic field measurement.
- 621.375.625 Lightning generator, high-voltage generator.
- 621.375.626 Fluid leak detector.
- 621.375.627 Fire and flame detector.
- 621.375.628 Clinical apparatus (non-radio use of v.t.)
- 621.375.629 Water depth or level indicator.
- 621.375.630 Meteorology.
- 621.375.631 General purpose power supply.
- 621.375.7 Weighing.
- 621.375.9 Miscellaneous non-radio applications of v. tubes.
- 621.379 Other electrical measuring instruments; synchroscopes.
- 621.38 Electric communication.
- 621.382 Telegraphy.
- 621.382.4 High-speed telegraphy.
- 621.382.5 Printing telegraph.
- 621.382.7 Picture transmission, facsimile (by wire)
(See also R581).
- 621.382.8 Submarine cable.
- 621.382.92* Ground telegraphy.
- 621.382.94 Induction signaling.
- 621.383.21 Relays.
- 621.385 Telephony.
- 621.385.91* Program distribution.
- 621.385.95* Condenser transmitters.
- 621.385.97* Electroacoustic devices; telephone units
(See also R594.4).
- 621.385.971* Electric phonograph.
- 621.388 Television (by wire).
- 621.39 Other applications of electricity.
- 622.12 Prospecting, electrical methods.

- 623.731Light signals.
- 623.823Steamships.
- 629.13Aeronautics.
- 629.132.5Aerial navigation.
- 629.13⁴Airplane construction.
- 629.136Airports, airdromes, seadromes.
- 658Business methods.
- 681.114.4Chronometers.
- 681.116Electric clocks.
- 681.13⁴Moving picture apparatus.
- 681.134.96*Sound motion pictures.
- 681.135Sound producers.
- 681.843Sound recording.
- R900 ..MISCELLANEOUS RADIO (Material which has no specific place. See also R000).

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